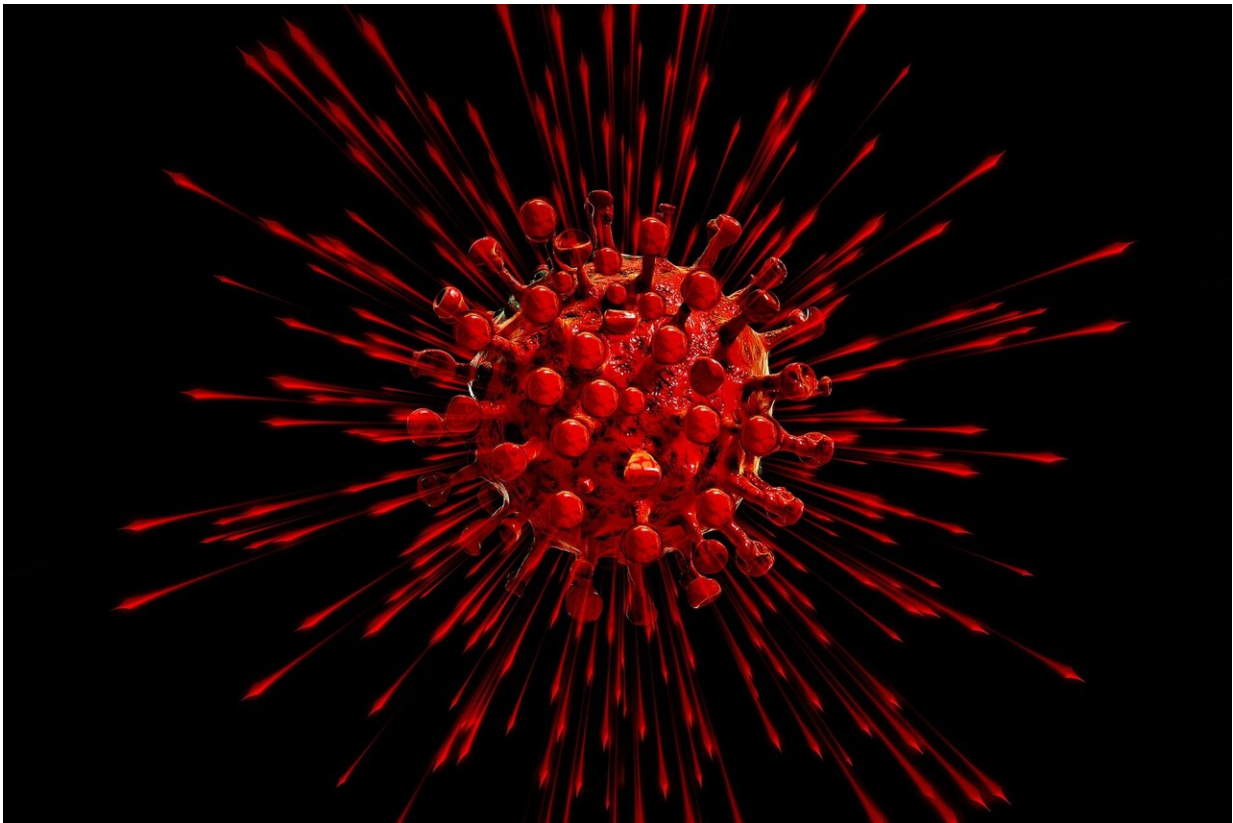


Carriers of two genetic mutations at greater risk for illness and death from COVID-19

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Tel Aviv University researchers suggest that carriers of the genetic mutations PiZ and PiS are at high risk for severe illness and even death from COVID-19. These mutations lead to deficiency in the

alpha1-antitrypsin protein, which protects lung tissues from damage in case of severe infections. Other studies have already associated deficiency in this protein with inflammatory damage to lung function in other diseases.

The study was led by Prof. David Gurwitz, Prof. Noam Shomron, and MSc candidate Guy Shapira of TAU's Sackler Faculty of Medicine, and published in The *FASEB Journal* on September 22, 2020.

The researchers analyzed data from 67 countries on all continents. Comparisons revealed a highly significant positive correlation between the prevalence of the two mutations in the population and COVID-19 mortality rates (adjusted to size of the population) in many countries, such as the U.S., the UK, Belgium, Spain, Italy, and more.

Consequently, the researchers suggest that these mutations may be additional risk factors for severe COVID-19. They now propose that their findings should be corroborated by [clinical trials](#), and if validated should lead to population-wide screening for identifying carriers of the PiS and/or PiZ mutations. Such individuals should then be advised to take extra measures of social distancing and later be prioritized for vaccination once vaccines are available. According to the researchers, these steps can be effective in reducing COVID-19 morbidity and fatality rates.

Analysis of databases reveals that in Belgium, where 17 of every 1,000 people carry the PiZ mutation (the more dominant of the two mutations discussed in this study), the COVID-19 mortality rate was 860 per million according to figures for September 2020. In Spain the picture is similar: 17 of every 1,000 citizens carry the PiZ mutation, and the COVID-19 fatality rate is 640 per million. In the U.S., where 15 per 1,000 are carriers, 590 of every million died of the [coronavirus](#).

The numbers in the UK are in line with the overall trend: 14 per 1,000 carry the mutation and 60 per million have died of COVID-19. In Italy, where 13 per 1,000 are carriers, the mortality rate is 620 per million. In Sweden, where 13 per 1,000 are carriers, the fatality rate is 570 per million.

On the other hand, the researchers found that in many countries in Africa and South East Asia, where these mutations are relatively rare, COVID-19 mortality rates are correspondingly low as of September 2020. In Japan, where 9 of every million died in the pandemic, the mutations' prevalence is negligible. Similar numbers were also found in China, South Korea, Taiwan, Thailand, Vietnam, and Cambodia.

Prof. Gurwitz, Prof. Shomron, and Shapira conclude, "Our [data analysis](#) reveals a strong correlation between these [mutations](#) and severe illness and death from COVID-19. We call upon the [research community](#) to test our hypothesis against [clinical data](#), and also call upon decision makers in every country to conduct population-wide screening for identifying mutation carriers and prioritize them for vaccination once COVID-19 vaccines have been approved. In the meantime, carriers should be notified that they may belong to a high-risk group and advised to maintain strict social isolation."

More information: Guy Shapira et al, Ethnic differences in alpha-1 antitrypsin deficiency allele frequencies may partially explain national differences in COVID-19 fatality rates, *The FASEB Journal* (2020). [DOI: 10.1096/fj.202002097](https://doi.org/10.1096/fj.202002097)

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